

WHAT IS CLAIMED IS:

1. A reaction mass apparatus comprising:  
a baseframe;  
at least one reaction mass, movably coupled to said baseframe by at least three first bearings, and coupled to a stage by at least two second bearings and at least one drive; and  
a plurality of bellows, each of said plurality of bellows surrounding a corresponding one of said at least three first bearings, wherein each of said plurality of bellows has a first end coupled to said at least one reaction mass.
2. The apparatus of claim 1, wherein each of said plurality of bellows has a second end coupled to said baseframe.
3. The apparatus of claim 1, wherein said at least three first bearings are fluid bearings.
4. The apparatus of claim 3, wherein said fluid is a pressurized gas.
5. The apparatus of claim 3, wherein said fluid is a liquid film.
6. The apparatus of claim 1, wherein said at least three first bearings are roller bearings.
7. The apparatus of claim 1, wherein said at least three first bearings are ball bearings.

8. The apparatus of claim 1, wherein said at least one drive each comprises:  
a linear motor coil coupled to said stage; and  
a magnet array coupled to one of said at least one reaction mass,  
wherein said linear motor coil and said magnet array are coupled magnetically.
9. The apparatus of claim 1, further comprising:  
an enclosure having a controlled environment and enclosing said stage,  
said at least two second bearings, said at least one drive, and said at least one reaction mass,  
wherein each of said plurality of bellows separates said corresponding first bearing from said controlled environment.
10. The apparatus of claim 9, wherein each of said plurality of bellows has a second end coupled to said enclosure.
11. The apparatus of claim 9, wherein a volume enclosed by each of said plurality of bellows has a pressure independent of the volume enclosed by said enclosure.
12. The apparatus of claim 9, wherein a flange couples said bellows first end to one of said at least one reaction mass.
13. The apparatus of claim 12, wherein said flange comprises a sliding surface for an enclosed first bearing.
14. The apparatus of claim 9, wherein a flange couples said bellows second end to said enclosure.

15. The apparatus of claim 9, wherein said baseframe is uncoupled from said enclosure.
16. The apparatus of claim 9, wherein said baseframe is coupled to said enclosure via rigid supports.
17. The apparatus of claim 9, wherein said baseframe is coupled to said enclosure via flexible supports.
18. The apparatus of claim 9, wherein said enclosure further encloses lithographic exposure means.
19. The apparatus of claim 1, wherein a flange couples said bellows first end to one of said at least one reaction mass.
20. The apparatus of claim 1, wherein a flange couples said bellows second end to said baseframe.
21. The apparatus of claim 1, wherein at least one of said first bearings is positioned such that it linearly guides one of said at least one reaction mass.
22. The apparatus of claim 1, wherein the mass of said stage is X times less than the mass of said at least one reaction mass, resulting in said at least one reaction mass moving, upon movement of said stage, a distance  $1/X$  the distance of the stage.
23. The apparatus of claim 1, wherein said at least one reaction mass is made of metal.
24. The apparatus of claim 1, wherein each of said plurality of bellows is made of metal.

25. A scanning apparatus used for lithographic processing within a controlled environment, comprising:

lithographic exposure means;

a baseframe;

at least one reaction mass movably coupled to said baseframe by at least three first bearings;

a stage, coupled to said at least one reaction mass by at least two second bearings and at least one drive;

an enclosure, having a controlled environment and enclosing said lithographic exposure means, said stage, said at least two second bearings, said at least one drive, and said at least one reaction mass; and

a plurality of bellows, each of said plurality of bellows surrounding a corresponding one of said at least three first bearings and separating said corresponding first bearing from said controlled environment, wherein each of said plurality of bellows has a first end coupled to said at least one reaction mass and a second end coupled to said enclosure.

26. The scanning apparatus of claim 25, wherein said at least three first bearings are fluid bearings.

27. The scanning apparatus of claim 26, wherein said fluid is a pressurized gas.

28. The scanning apparatus of claim 26, wherein said fluid is a liquid film.

29. The scanning apparatus of claim 25, wherein said at least three first bearings are roller bearings.

30. The scanning apparatus of claim 25, wherein said at least three first bearings are ball bearings.

31. The scanning apparatus of claim 25, wherein said at least one drive each comprises:

a linear motor coil coupled to said stage; and

a magnet array coupled to one of said at least one reaction mass,

wherein said linear motor coil and said magnet array are coupled magnetically.

32. The scanning apparatus of claim 25, wherein a volume enclosed by each of said plurality of bellows has a pressure independent of the volume enclosed by said enclosure.

33. The scanning apparatus of claim 25, wherein a flange couples said bellows first end to one of said at least one reaction mass.

34. The scanning apparatus of claim 25, wherein a flange couples said bellows second end to said enclosure.

35. The scanning apparatus of claim 25, wherein said baseframe is uncoupled from said enclosure.

36. The scanning apparatus of claim 25, wherein said baseframe is coupled to said enclosure via rigid supports.

37. The scanning apparatus of claim 25, wherein said baseframe is coupled to said enclosure via flexible supports.

38. The scanning apparatus of claim 25, wherein at least one of said first bearings is positioned such that it linearly guides one of said at least one reaction mass.

39. The scanning apparatus of claim 25, wherein the mass of said stage is X times less than the mass of said at least one reaction mass, resulting in said at least one reaction mass moving, upon movement of said stage, a distance  $1/X$  the distance of the stage.

40. The scanning apparatus of claim 25, wherein said at least one reaction mass is made of metal.

41. The scanning apparatus of claim 25, wherein each of said plurality of bellows is made of metal.